

Fuel Tank Supports & Earthquakes



The use of raised fuel tanks, to provide gravity flow to oil heaters, is common throughout Alaska. During the Denali Fault earthquake on November 3, 2002, several 300 gallon fuel tanks tipped or slid from their supports, demonstrating their vulnerability. By strengthening fuel tank supports and connectors to withstand ground shaking, the risk of damages, hazardous spills, and loss of heating can be reduced. Once the structure is built, regular inspection is recommended to ensure structural integrity.

Wood Support



A wood support is vulnerable to damage due to deterioration or inadequate cross-bracing and fastening. It should be inspected for rot damage, and any deteriorating wood supports replaced. Wood support without cross-bracing, or insufficient cross bracing, should have diagonal bracing or gussets added to strengthen the wood support. Utilizing wood-to-wood connecting plates, bolts, lag screws, and nails are useful to reduce vulnerability, but their effectiveness is limited by the tendency of wood fibers to split and tear when subjected to large loads. (Wood support pictured on left was damaged in the Denali Fault Earthquake.)

Cradle Support



A timber cradle support is a safe and affordable wood support option. Strength and stability are provided by the broad base and the criss-cross stacking fashion of the timbers. The timbers need to be pressure treated and should be 6"x 6" or larger. Each layer is spiked to the last with large spikes, pins, or bolts that are driven into pre-drilled holes to prevent splitting. The tank is strapped to the cradle with two steel bands (a special banding tool is required).

Steel Support



A steel support system is available when purchasing a tank from a fuel company. The steel support's angle iron construction and welded joints provide rigidity and strength to resist gravity loads and mild shaking. Steel supports with a wide footprint will have increased stability. Some steel supports may not have adequate diagonal bracing. Retrofitting may be needed to withstand strong lateral motion during a major earthquake. Greater stability can also be improved by securely bolting the steel support to 6"x6" pressure treated wood timbers or railroad ties on the ground. Steel banding to tie the tank to the support is another important retrofit.

Supply Line Connection

The fuel line between the tank and house should include a flexible loop of copper tubing to reduce the possibility of a rupture and oil spill. Also, clear the area around the tank of tall or heavy objects that could fall on the tank or rupture the supply line.

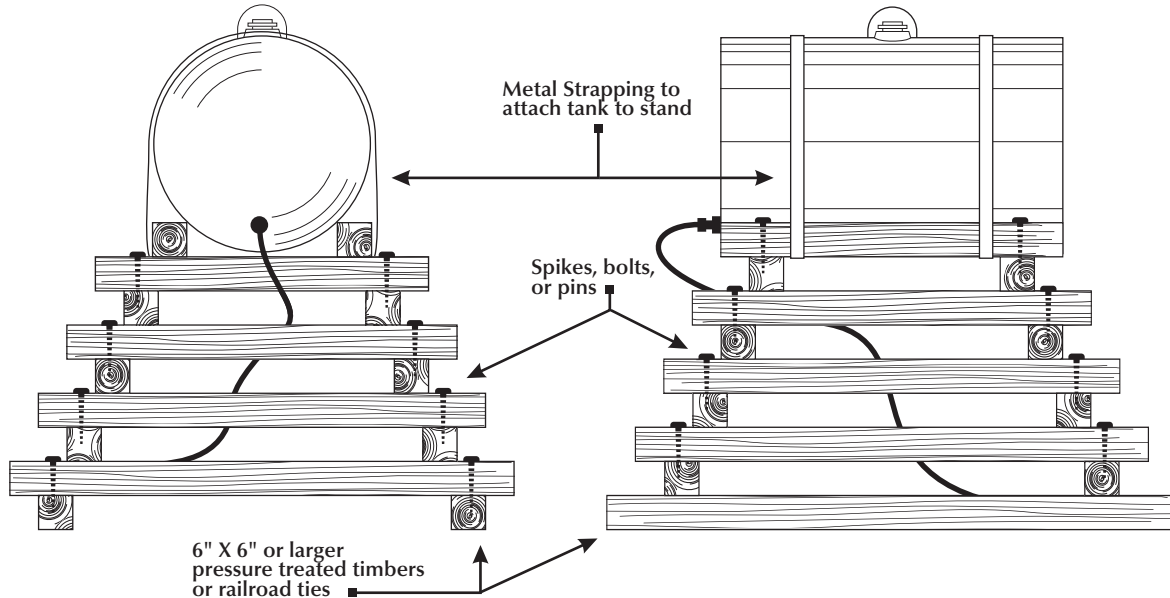


Diagrams of a cradle and steel support are on reverse side of handout.
For further information, visit www.fema.gov and www.ak-prepared.com.

Wood Fuel Tank Stand

This diagram shows how to build a wood cradle that is likely to withstand large earthquakes. The design uses commonly available items and can be

built by most anyone. This stand is designed to support the average size fuel tank (300 gallons) at a typical height of 4 feet.



Steel Fuel Tank Stand

This diagram shows how a steel tank support can be improved to withstand large earthquakes. These supports are commercially fabricated using welded

angle iron, and they typically support 300 gallon tanks at heights of 3 to 5 feet. A wider base and bolting the support to pressure treated timbers provides more stability.

